

## Original Research Article

# A comparative study of tympanoplasty with or without mastoidectomy in tubotympanic type of chronic suppurative otitis media

Rachna Vijayan Nambiar, G. Priyadarshini\*, Aishwarya Tiwari

Department of ENT, Aarupadai Veedu Medical College, Puducherry, India

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**\*Correspondence:**

Dr. G. Priyadarshini,

E-mail: priyababu12@yahoo.co.in

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### ABSTRACT

**Background:** CSOM is one of the most common ear diseases in developing countries. Lack of an aerating mastoidectomy at the time of the initial tympanoplasty may be a significant source of failure in patients with chronic non-cholesteatomatous otitis media so cortical mastoidectomy along with tympanoplasty has for long been considered the surgical procedure of choice. The purpose of our study is to ascertain the effectiveness of tympanoplasty with or without cortical mastoidectomy.

**Methods:** Our study was carried out in the Department of Otorhinolaryngology, Aarupadai Veedu Medical College, Pondicherry. It included 50 patients of CSOM tubotympanic type of age between 15 years to 45 years and of either sex who were diagnosed and treated in E.N.T Department during the study period October 2016 to August 2018. Out of 50 patients who underwent surgery in 25 cases tympanoplasty with mastoidectomy was done and tympanoplasty without mastoidectomy was performed in 25 cases.

**Results:** Commonest age group was 15-19 years. Male to female ratio was 1.6:1. In x-ray bilateral mastoids Schuller's view, 24 patients (48%) had sclerotic mastoids and 26 patients (52%) showed pneumatic mastoids. Clinical improvement, graft uptake and postoperative hearing improvement was similar in both the groups.

**Conclusions:** Most common age group of presentation with CSOM tubotympanic type is 15-25 years. CSOM tubotympanic type appears to be more common in males. Hearing improvement following tympanoplasty alone and tympanoplasty with mastoidectomy were comparable in both the groups. Mastoidectomy with tympanoplasty does not give additional benefit in terms of hearing improvement.

**Keywords:** CSOM, Mastoidectomy, Tympanoplasty

### INTRODUCTION

CSOM is defined as "a persistent disease, insidious in onset, often capable of causing severe destruction of middle ear structure, which is clinically manifested with deafness and discharge for more than three months". Chronic suppurative otitis media (CSOM) has been an important cause of middle ear disease since prehistoric period and it is one of the most common ear diseases in developing countries.<sup>1</sup> Poor living conditions, overcrowding, poor hygiene and nutrition have been

suggested as the basis for the widespread prevalence of CSOM in developing countries.<sup>2</sup> The disease is characterised by recurrent or persistent ear discharge (otorrhoea) over 2 to 6 weeks through a perforation of the tympanic membrane. CSOM is classified into two types- tubotympanic (mucosal) and atticofacial type (squamosal).

Mastoid plays an important role in middle ear aeration and pressure regulation. There has been a clinical impression that lack of an aerating mastoidectomy at the

time of the initial tympanoplasty may be a significant source of failure in patients with chronic non-cholesteatomatous otitis media so cortical mastoidectomy along with tympanoplasty has for long been considered the surgical procedure of choice.<sup>3</sup>

Tympanoplasty by definition is “an operation performed to eradicate disease in the middle ear and to reconstruct the hearing mechanism, with or without tympanic membrane grafting”.<sup>4</sup> Cortical mastoidectomy is a surgical procedure performed to remove disease from the mastoid antrum and the air cell system and aditus and antrum with preservation of intact bony external auditory canal wall, without disturbing the existing middle ear contents.<sup>5</sup>

The role of mastoidectomy in tympanoplasty is debatable. The purpose of our study is to ascertain the effectiveness of tympanoplasty with or without cortical mastoidectomy.

**METHODS**

Our study was carried out in the Department of Otorhinolaryngology, Aarupadai Veedu Medical College, Pondicherry. It included 50 patients of CSOM Tubotympanic type of age between 15 years to 45 years and of either sex who were diagnosed and treated in E.N.T department during the study period October 2016 to August 2018. Out of 50 patients who underwent surgery in 25 cases tympanoplasty with mastoidectomy was done and tympanoplasty without mastoidectomy was performed in 25 cases.

**Inclusion criteria**

Patients of age between 15 to 45 years diagnosed with CSOM tubotympanic type with conductive hearing loss, dry or moist ear.

**Exclusion criteria**

Exclusion criteria were age less than 15 years and more than 45 years of age; patients with mixed or pure sensorineural hearing loss; patients having multiple TM perforations/other ear diseases; medical contraindications to undergo surgery; CSOM with complications.

Complete examination and investigations were done including Otoendoscopy, tuning fork tests (Rinnes, Weber and ABC tests), eustachian tube functions like Valsalva’s maneuver, X-ray bilateral mastoid Schuller’s view, Preoperative pure tone audiometry, Postoperative follow-up and PTA at 1 month and 3rd month. These patients were segregated into two groups based on random sampling. First group included patients who underwent tympanoplasty alone and the second included patients who underwent tympanoplasty with mastoidectomy.

**Statistical method**

The comparison of tympanoplasty with or without mastoidectomy was performed by chi-square test. The following statistical methods were used Chi-square test and SPSS version 16 software.

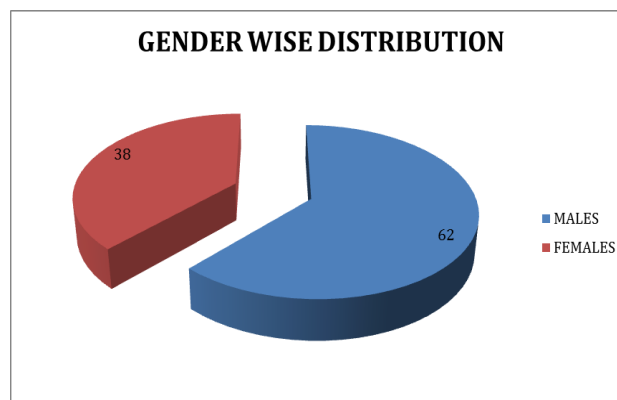
**RESULTS**

In the present study most of the patients that is 13 patients (26%) were in the age group between 15-19 years. 10 patients (20%) were in the age group between 20-24 years. In the age group between 25-29 and 30-34 there were 8 (16%) and 7 (14%) patients respectively. 6 patients (12%) belonged to age group of 35-39 and 40-45 years each.

**Table 1: Age wise distribution.**

Age	No of patients	Percentage (%)
15-19	13	26
20-24	10	20
25-29	8	16
30-34	7	14
35-39	6	12
40-45	6	12
<b>Total</b>	<b>50</b>	<b>100</b>

In the present study, out of 50 patients, 31 patients (62%) were males and 19 (38%) were females.



**Figure 1: Gender distribution.**

In x-ray bilateral mastoids Schuller’s view, 24 patients (48%) had sclerotic mastoids and 26 patients (52%) showed pneumatic mastoids.

**Table 2: X-ray mastoid.**

Pneumatisation of mastoid	Number of patients	Percentage (%)
Sclerotic	24	48
Pneumatised	26	52

Clinical improvement was similar in both groups. 4 patients presented with discharge in without mastoidectomy group and 3 patients showed discharge in tympanoplasty with mastoidectomy group. There was no significant statistical difference found in both the groups.

**Table 3: Clinical improvement.**

	Without mastoidectomy		With mastoidectomy	
	No	%	No	%
<b>Discharge (+)</b>	4	16	3	12
<b>Discharge (-)</b>	21	84	22	88

P=0.5.

Graft was taken up in 88% of cases in tympanoplasty with mastoidectomy group and 84% in tympanoplasty

without mastoidectomy group. There was no significant statistical difference found in both the groups.

**Table 4: Graft status.**

	Without mastoidectomy		With mastoidectomy	
	No	%	No	%
<b>Taken up</b>	21	84	22	88
<b>Failure</b>	4	16	3	12

P=0.5.

Post operatively improvement in hearing was found in the range of 0-20 dB gain in 6 (24%) cases by doing tympanoplasty alone and by combining with mastoidectomy improvement in hearing was found in 8 (32%) cases. There was no statistical difference found in either of the groups.

**Table 5: PTA findings with mastoidectomy.**

AB gap in dB	Preoperative		1 <sup>st</sup> month		3 <sup>rd</sup> month	
	No of patients	%	No of patients	%	No of patients	%
<b>0-10</b>	0	0	0	0	0	0
<b>11-20</b>	0	0	0	0	8	12
<b>21-30</b>	8	32	9	36	9	48
<b>31-40</b>	10	40	8	32	3	12
<b>41-50</b>	7	28	8	38	5	28

**Table 6: PTA findings without mastoidectomy.**

AB gap in dB	Preoperative		1 <sup>st</sup> month		3 <sup>rd</sup> month	
	No of patients	%	No of patients	%	No of patients	%
<b>0-10</b>	0	0	1	4	1	4
<b>11-20</b>	0	0	5	20	5	20
<b>21-30</b>	15	60	7	28	7	28
<b>31-40</b>	8	32	8	32	8	32
<b>41-50</b>	2	8	4	16	4	16

P value= 0.1.

## DISCUSSION

In the present study, 23 patients were in the age group between 15-25 years. The reason could be that, in this age group people are more socially active and health conscious.

In comparison to our study, in the study done by Bhusal et al majority i.e., 35 patients (70%) were in the age group between 15-24 years.<sup>6</sup> In another study conducted by Parag et al majority of patients were in the age group of 11-20 years.<sup>7</sup>

In our study male preponderance was observed with 62% males and 38% females.

In the study conducted by Raju et al, similar observation was made with 53% males and 47% females.<sup>8</sup> Male

preponderance was also observed by Kumar et al in which 52% were males and 48% were females.<sup>9</sup>

The possible reason for high predominance in males could be, because our society is conservative where men have more privileges when compared with women in being taken to tertiary centers for treatment and they indulge in outdoor work. These findings were in accordance with the study done by Poorey et al.<sup>10</sup>

In our study on plain X-ray of mastoids 24 patients were found to have sclerosed mastoid air cells whereas only 26 were found to have well pneumatized mastoid cells

This above observation correlates with the findings of Rickers et al where the cellular mastoid was described as well pneumatized in 47%.<sup>11</sup> Of these patients 74% had

mastoid inflammation and 28% had fluid in the mastoid cells.

On the contrary, in the study performed by Charles et al, 17% of patients had pneumatized bone in the X ray.<sup>12</sup> In another study Jackler and Schindler et al studied 48 patients with chronic otitis media with tympanic perforations who underwent myringoplasty with mastoidectomy.<sup>13</sup> In their study, it was found that simple mastoidectomy was found to be an effective means of re-pneumatizing the sclerotic mastoid and restoring the hearing.

Since the cases were chronic in nature probable involvement of the bone early in the disease and body defense trying to ward off the infection/confine the disease to middle ear cleft by forming reactive sclerosing around the bone could explain the sclerotic nature of the bones in the patients.

On assessment post-surgery about 84% patients who had undergone tympanoplasty with mastoidectomy, graft was taken up successfully however 16% patients returned with graft failure. Patients who underwent tympanoplasty without mastoidectomy 88% had successful graft take up and 12% had graft failure.

Balyan et al have reported equivalent results of graft take up and hearing result with or without mastoidectomy.<sup>14</sup> In the retrospective study performed by Balyan et al, it was observed that mastoidectomy is not always necessary for treatment of patients with non-cholesteatomatous chronic otitis media.<sup>14</sup>

Mishiro et al, also supported tympanoplasty without mastoidectomy in chronic non-cholesteatomatous otitis media with an equivalent rate of grafting success and hearing results regardless of the state of the ear at repair (draining vs. nondraining) or the addition of a mastoidectomy.<sup>15</sup>

A study by McGrew et al examined the effect of mastoidectomy with canal wall up v/s tympanoplasty alone.<sup>16</sup> Their results showed identical perforation closure success rates of 91% in each group.

In our study we found a comparable improvement in hearing in patients who had undergone tympanoplasty alone or tympanoplasty with mastoidectomy.

In a study by Krishnan et al, post-operative hearing gain was 75% in both groups.<sup>17</sup>

Blakley et al studied the relationship between pre and post-operative hearing in 124 patients undergoing tympanoplasty.<sup>18</sup> They found that poor hearing before surgery was associated with poor healing after surgery, regardless of anatomy. They concluded that, in ears with persistent infection, the hearing outcome after tympanomastoidectomy surgery depended more on pre-

operative hearing levels than on the type of tympanoplasty performed.

This was in coordination with Bhat et al who observed that ears with a wider preoperative air-bone gap fared more poorly after surgery, compared with those with a narrower air-bone gap.<sup>19</sup> Albu et al in 2012 presented a paper of 320 consecutive adult patients who were treated by tympanoplasty with cortical mastoidectomy and tympanoplasty alone. They found that three factors were significant in predicting success rate, which are, healthy opposite ear, a long dry period before the surgery, and a non-smoker status.<sup>20</sup> The only factor attaining significance in the multivariate analysis was a dry period more than 3 months. They concluded that cortical mastoidectomy doesn't give additional benefit in tympanoplasty performed in patients with CSOM tubotympanic type.

## CONCLUSION

Most common age group of Presentation with CSOM tubotympanic type is 15-25 years. CSOM tubotympanic type appears to be more common in males. Hearing improvement following tympanoplasty alone and tympanoplasty with mastoidectomy were comparable, No statistical difference was found in either of the groups. Mastoidectomy with tympanoplasty does not give additional benefit in terms of hearing improvement.

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